

this Snipe and shot the parent bird. Later he found three more, one at the Monastery ($65^{\circ} 40'$ N. lat.) and the other two on the tundra. Two of these four nests contained four eggs each and the others only two. The eggs he describes as differing considerably from those of *Gallinago caelestis*, in being larger, in having the ground-colour as in eggs of *Gallinago major*, and in being much more richly marked, the spots being in almost all cases very profuse at the larger end and in some cases confluent. The measurements of these eggs were 1.59 by 1.24, 1.61 by 1.12, 1.66 by 1.2, and 1.74 by 1.18 inches respectively. Mr. Popham has also given (Ibis, 1898, p. 514) some particulars of the habits of the bird, which I need not repeat here. On his third visit to the Yenesei River in 1900 he took four more nests of this Snipe.

On Plate VI. I have figured four of the eggs, in order to shew the variations as clearly as possible. These were all taken on the Yenesei.

EXPLANATION OF PLATE VI.

Figs. 1 & 2. Eggs of *Chettusia leucura*, from Transcaspia.

3-6. Eggs of *Gallinago stenura*, from the Yenesei.

Fig. 3. From clutch No. 352. June 26th, 1897.

4. „ „ No. 495. May 25th, 1900.

5. „ „ No. 178. May 29th, 1897.

6. „ „ No. 497. June 27th, 1900.

XIII.—On a Collection of Birds from Western Australia.

By ROBERT HALL.

[Concluded from p. 143.]

34. MELITHREPTUS CHLOROPSIS. Western Lunulated Honey-eater. (Hall's Key, p. 38.)

A, B, C. Ad. sk. Sept. 25th, 26th, and 27th, 1899. Denmark.

D. Young.

These specimens differ decidedly, in so far as the eye-region is concerned, from all those previously referred to. The question that has interested us most of late is whether

Dr. Gadow was right in joining this species to the eastern *M. lunulatus*.

From personal observation and from my collection of skins I conclude that there is a western representative of *M. lunulatus*, so we may now separate the two forms joined in the British Museum Catalogue. Besides this a difficulty presents itself if we wish to refer my skins to the species *M. chloropsis*, because, I take it, Gould has insufficiently described the eye-region of the bird, and that part is incorrectly coloured in his plate. I do not care to regard my skins as giving evidence of a new species, because I believe that Gould has described two phases; besides which there is a third, hitherto unnoticed—and that the most adult, as the naked spaces surrounding the eye are large. More extended research may shew that (*a*) the pale green of the bare space above the eye changes into (*b*) a pale wine-yellow, and at a later season into (*c*) a sappy white. Furthermore, at this later season it may be shown that a bare space becomes prominent below the eye, and that there is a hidden bare region at the posterior angle, the former being leaden blue and the latter faint blue-green. No reference has been hitherto made to the bare spaces below and behind the eye: (*a*) and (*b*) are the parts as described by Gould, while (*c*) represents the appearance in three skins collected by myself, and in at least six others closely and carefully noted and found to possess the same distinct marks. Since the eastern *M. lunulatus* varies in the colour of its eye-region with age (this is how I view the shades of red), the western form may for the present be assumed to do likewise, but apparently to a greater extent. Future research may show more points of interest in this connexion.

Description of these parts in the specimens secured by the writer:—Bare space above the eye dull sappy- or fungus-white. Bare space below the eye, which is quite as large, dull lead-blue in colour. Hinder angle of both bare parts that are hidden by the imbricate feathers faint blue-green. Iris bright hazel, with a tendency to red.

In comparing these three skins with five of *M. lunulatus*,

I find that they are more brightly coloured and that two are considerably larger, while the third has practically the same measurements of bill and wings.

The western skins shew :—

A and B. Total length 5·85 inches, wing 3·15, culmen 0·52.

C. Total length 5·25 inches, wing 2·9, culmen 0·45.

My observations on this form were made in the Karri forest country that lies some fifty miles in from Albany and has only recently been opened up by a timber company. To what extent this will affect the bird I cannot well say.

There is a specimen of the nest of this species in the Perth Museum which has the peculiarity of being much like that of the Robin, *Petræca phœnicea*. Those of the *Melithrepti* are not generally loosely constructed and placed between three strong prongs. However, this does not seem more wonderful than that the western Spine-bill should build an abnormal type of nest in a similar position near Albany.

35. GLYCYPHILA OCULARIS. Brown Honey-eater. (Hall's Key, p. 40.)

A. Ad. ♂. Geraldton. 27.10.99. Total length 5·25 inches, wing 2·64, tarsus 0·65, tail 2·25.

B. Ad. ♀. Geraldton. 14.10.99. Total length 5·35 inches, wing 2·63, tarsus 0·65, tail 2·25.

C. Young. Geraldton. 27.10.99. Total length 3·5 inches, wing 1·85, tarsus 0·65, tail 0·9.

Description of an immature bird (being fed among the foliage by the parents; this is the young of A).—The abdomen and breast are faint yellow. A large area behind and below each eye and continued under the lores is bare, but the series of peculiar feathers that afterwards make this species conspicuous are represented by spots which appear to be beneath the skin. Although the rectrices extend from their sheaths only to a length of 0·6 inch, there is a clear flush of green upon them, particularly on the ventral surface, in contradistinction to their state in the adult, which shews the green wash more clearly on the dorsal surface

owing to the arrangement of the lateral parts of the webs. The nasal groove occupies nearly one half of the length of the mandible (0·35 inch), just as it does in the adult (0·6 inch) ; the feet are bluish, more so than in the adult.

Specimen A.—The peculiarity is here a faint flush of olive-green upon the lower breast and abdomen. Even though the parent of C, it still retains the colour indicative of youth ; moreover, the youth of this particular specimen is evidenced by faint yellow on the breast and abdomen.

This bird was tolerably numerous upon the sand-plains, which are richly decorated at the above time of year with a great variety of blossoms and teem with honey-laden shrubs, herbs, and *Banksia*-trees.

36. *PTILOTIS SONORA*. Singing Honey-eater. (Hall's Key, p. 41.)

One adult male. 27.10.99. Geraldton.

An orchid owner spoke of this species as quite a grape-stealer ; but such a failing is not confined to the western bird alone, as a similar statement has been made in the eastern colonies.

37. *PTILOTIS LEILAVALENSIS*. Lesser White-plumed Honey-eater. (Hall's Key, p. 43.)

		Wing.	Tail.	Bill.	Tarsus.
		in.	in.	in.	in.
A. Ad. ♂.	27.10.99. Geraldton...	2·9	2·65	0·5	0·8
B. Ad. ♂.	14.10.99. „ ...	3·05	2·85	0·5	0·8
C. Ad. ♂.	27.10.99. „ ...	3·1	3·0	0·5	0·8
	Average	3·01	2·83	0·5	0·8
	Average of six skins of <i>P. penicillata</i> .	3·19	3·13	0·43	0·8

In these specimens the black at the base of the post-auricular patch is variable in position. A nest found at Geraldton on Oct. 29th contained two unfledged young. Exteriorly it was formed of the filament-bearing seeds of *Clematis* and interiorly of white horsehair. Eggs collected for me by Mr. Douglas Darling at Geraldton agree tolerably well with the description given by Mr. A. J. Campbell in the Vict. Nat. vol. xvi. p. 87.

38. *PTILOTIS ORNATA*. Yellow-plumed Honey-eater.
(Hall's Key, p. 43.)

Four ad. sk. Katanning. Oct. 4th to 7th, 1899.

One of these skins shews a uniform grey head and under tail-coverts broadly marked upon the mid-rib in lanceolate fashion ; apart from this it resembles the others.

One mile from the city of Perth a cup-like nest was found hanging from two slender twigs of a Eucalypt some twenty feet from the ground (9.11.99). It was made of wiry green grass and was slightly ornamented with spiders' webs. The lining was composed of "palm wool" (*Macrozamia*), which is gathered by settlers to make head-rests for sleeping purposes. External diameter of nest 2.5 inches, internal diameter 2.1, depth of cavity 2.

The bird insisted upon staying on its nest until the limb to which it was attached fell upon a branch below, and it was frightened away by my hands.

39. *MELIORNIS LONGIROSTRIS*. Long-billed Honey-eater.
(Hall's Key, p. 43.)

A. Ad. ♂.	26.9.99.	} Tor Bay, Albany.
B. Ad. ♂.	29.9.99.	
C. Ad. ♀.	29.9.99.	
D. Imm.	26.9.99.	

This bird is merely a western subspecies and so much resembles the eastern species *M. novæ-hollandiæ* that to determine to which form an individual belongs in an intermediate country such as South Australia will probably be extremely difficult. I agree with Dr. Ramsay* that Gould's account of the bill will be of no assistance in the case of the subspecies ; but I also notice that in my adult specimens the cheek-feathers are "a little longer, form a more ovate patch, and are slightly hair-like." The culmen measures 0.75 inch, 0.75, 0.85.

Description of an immature bird (D).—Forehead and crown brownish black ; nape blackish brown ; back similar to that of the adult ; the stripe retreating from above the eye whitish ; cheek-tufts and hair-like feathers upon the neck dirty white ;

* 'Tabular List of Australian Birds,' Notes, p. 12 (1888).

basal two-thirds of lower mandible flesh-coloured. Culmen 0·7 inch. In other respects similar to the adult.

40. *MANORHINA FLAVIGULA*. Yellow-throated Minah. (Hall's Key, p. 44.)

To identify three clutches of eggs found on Oct. 4th, an adult specimen was shot. Length of wing 4·95 inches. One nest was placed in a *Hakea* some five feet from the ground and another in a *Eucalypt* twenty feet high. The fabric has the same appearance as an eastern example, being 3·5 inches in external diameter, 2·5 in internal diameter, and 2 deep (cavity).

41. *ACANTHOCHÆRA CARUNCULATA*. Red-wattle Bird. (Hall's Key, p. 44.)

Sk. ad. ♀. 4.10.99. Katanning.

A nest with two fresh eggs contained also one of *Cuculus pallidus* (Oct. 4th). Outwardly the structure was assimilated in appearance to the supporting tree, being made of acacia ("jam") twigs. The middle layer was of grass and the lining of sheep's wool, particularly thick at the bottom. External diameter 6 inches, internal diameter 3, depth of bowl 1·5.

42. *PARDALOTUS ORNATUS*. Striated Pardalote. (Hall's Key, p. 46.)

One ad. sk. 4.10.99. Katanning. (Yellow specula.)

I secured a specimen of a Pardalote to determine the species and concluded that it was *P. affinis*. Upon re-examination at home I was very much surprised to find the wings marked with white as in *P. ornatus*, while the bold specula were yellow. This constituted a phase not hitherto recorded, as *P. ornatus* is only known to assume the scarlet tipping. If the subspecies *P. assimilis* is allowed to have so wide a range in the colouring of the speculum as scarlet, crimson, orange, or yellow, the same may be the case here. I feel disposed to consider it merely a matter of time to discover that birds with the scarlet and lemon specula exist in one or more areas of the continent; and then the species will be placed on the same footing as the subspecies as regards the speculum.

As for the species *P. affinis* (always yellow-tipped), I believe it to be only a phase of the subspecies *P. assimilis*. On a previous occasion* I proved *P. assimilis* to have only the third quill edged with white (scarlet speculum), and the speculum may be yellow just as in the "third and fourth quill" phase. If this is really so, and I see no reason to the contrary, there is nothing to distinguish it from *P. affinis*. Proof will doubtless be forthcoming in support of my view, as specimens come in from time to time, even if the delay is as long as in the finding of the specimen under review. I shall then place *P. affinis* along with *P. assimilis*.

43. *CHERAMŒCA LEUCOSTERNUM*. Black-and-White Swallow. (Hall's Key, p. 47.)

I identified this species from one specimen obtained at Geraldton, 14.10.99. A second example was nesting in a sand-bank and incubating four eggs.

To others as well as myself it is surprising that this short-legged and small-billed bird should be so fond of burrowing. Apparently feebly formed, its bill must perform a movement similar to that noticed in certain Picarian birds that also tunnel. In one cliff-side a pair of Swallows had made five "caves" six inches apart in a line. The first in order penetrated some three inches into the firm sandy soil, while the others were each successively a little deeper, and the last was nearing completion.

44. *PETROCHELIDON NIGRICANS*. Tree-Martin. (Hall's Key, p. 47.)

One skin was procured at Denmark on Nov. 3rd. This species was nesting freely in the hollows of very high dead timber. I had to wait twenty minutes before a bird came low enough to be killed with small-sized shot.

45. *ANTHUS AUSTRALIS*. Pipit. (Hall's Key, p. 47.)

A. Sk. ad. ♂.	27.10.99.	} Geraldton.
B. Sk. imm.	29.10.99.	

My attention was particularly drawn to the colouring in

* Proc. Linn. Soc. N. S. Wales, vol. xxiv. p. 472 (1899).

specimen A and slightly to that in B. So dense and so uniform was the "pale" rufous in A (exceptions to follow) that I concluded this individual to be either an abnormal form or that Dr. Sharpe was wrong in his remark that "Tasmanian birds are more rufous than mainland ones." I possess very rufous skins from Warragul in Victoria, Nannine, and Geraldton; in addition to which specimen A is so rufous that the ordinarily white feathers of the tail and the white throat are both rufous white.

Gould has remarked upon the possibility of the rufous colour relating to the moult. My specimen (A) is a bird in much-worn plumage. It has been thought also that the rufous may indicate the young. I have a nestling that is more rufous and black than a young bird; but again I have a young bird that is more rufous than a nestling; while I possess two adults, from Victoria and West Australia respectively, one of which is particularly rufous, while the other is almost absolutely so. The absence of dates in the case of the British Museum specimens has prevented Dr. Sharpe from following out the sequence of plumages*.

46. ARTAMUS MELANOPS. Black-faced Wood-Swallow. (Hall's Key, p. 48.)

- | | | |
|---------------|------------|---------------|
| A. Sk. juv. | 14.10.99.) | } Geraldton. |
| B. Sk. ad. ♂. | 16.10.99.) | |
| C. Sk. ad. | 14.10.99.) | |
| D. Sk. ad. ♀. | 3.9.99. | Nannine, Cue. |

The length of the wing of the young bird is 4.95 inches, while in the adults it is 4.6, 4.75, and 5.2 inches respectively, shewing specimen A to have a longer wing than B or C. The brownish-white markings of the wing-tips of the juvenile are broad in comparison with those of the adult D, while specimens B and C are intermediate in this respect. D is very much lighter in colour than the others and causes confusion with the questionable species *A. cinereus* Vieill.

* In my material there are two phases. Among the specimens of the South Australian Museum there is a rufous skin, as well as one in sooty plumage, heavily blotched with black. This seems to imply that the species is trimorphic.

In A, B, and C the under tail-coverts are not narrowly edged with white; those of D are clearly so.

Description of A (young).—Shafts of head- and neck-feathers fulvous, giving a light-brown appearance; upon the slate-grey of the back are a few feathers deeply edged with fulvous; rump brownish black, with small brown edgings to feathers; tail much as in adult; wings slate-grey, tipped with dirty white, the outer webs darker than the inner; a few of the upper coverts edged with fulvous; chin and lores black; throat grey; chest, breast, and abdomen sooty grey; under tail-coverts black; under wings silvery grey, coverts white.

So thoroughly insectivorous is this species, in common with others of its genus, that in search of insects it dips its bill into the corollæ of flowers and brings it out covered with pollen, which makes the black chin and forehead appear yellow. It is thus an effective agent in the process of cross-fertilization.

47. *ZONÆGINTHUS OCULATUS*. Red-eared Finch. (Hall's Key, p. 49.)

Two ad. sk. Sept. 27th, Oct. 2nd. Denmark.

At Tor Bay I observed this Finch building a nest, from which, four days later, I took two fresh eggs. Both eggs and nest are what Australians call "typical Finches'." A *Banksia* situated amongst "black boys" (*Xanthorrhœa*) was utilized for the nest, a good look out being thus ensured over an acre or two of ground.

So far as I saw, the south-west corner of Australia did not appear to contain many Finches, and they were represented by one species only. Only two out of twenty Australian species are found in West Australia, one of which I do not think would care to live in the moist climate of the south-west. The resident form is the "red-eared," which seems to me to act in the south-west the part that the "red-browed" species plays in the south-east, most of each district being damp and wild.

48. *PODARGUS PHALÆNOIDES*. Freckled Frog-mouth. (Hall's Key, p. 55.)

Fledgling, sk. 28.10.99. Geraldton.

Description of fledgling.—There were two specimens in

the nest, of which this was the larger. Upper surface grey with conspicuous black shaft-lines; a faint wash of pale red upon the scapulars and upper surface of tail; freckling of adult faintly represented; upper tail-coverts brown, white-tipped, and with the barbules free; wings much like those of the adult, but without rufous, which is represented by a pale flush of pink. Whole under surface brownish grey, all the feathers below the chest being without barbules; throat- and chest-feathers with distinct shaft-streaks; breast with faint shaft-streaks; abdomen faintly rayed, edges of feathers grey; under tail-coverts with dark centres and grey tips; iris yellow. Total length 10 inches, wing 4·9, tarsus 0·85, mid-toe without claw 1·15.

In the British Museum Catalogue I find that Mr. Hartert gives no description of the male in the absence of an authenticated skin, nor do I know of any. It so happens that, while on a visit to Europe, Mr. Dudley Le Souëf asked Mr. Hartert to identify a certain skin for him, which proved to be *P. phalænoides*. Being the skin of a male from Cardwell, Queensland, I may note its leading characters as follows:—

Description of an adult male.—There is much rufous freckling and vermiculation, but no decidedly uniform rufous tint. The whole upper surface is mainly grey, each feather being narrowly streaked with black on the shaft-line. The rufous freckling is fine and heavy. There is a large amount of white freckling on the wings, particularly towards the scapulars. The feathers of the under surface are covered with rufous vermiculations, above and below which are white patches that are much larger; these do not appear on the throat otherwise than as fine marks; the brown shaft-lines are conspicuous. In other respects the skin corresponds with that of the female described in the Catalogue. Total length 15·5 inches, wing 8·5, tail 7·1, bill from angle of mouth 2·25, tarsus 0·95, mid-toe without claw 1·3.

The fledgling when placed upon a bough instinctively assumed the pose of the parent, although it was never before out of the nest. After a certain amount of handling, this posture, obtained by inheritance alone, was no longer retained, the bird's pose becoming limp. The experience of

the western boy is very much that of the eastern when this bird is seen for the first time, judging by the remark he makes: "Look at the Wattle-bird's nest on which some one has thrown a piece of bark." As the "bark" moves the true state of affairs becomes apparent: it is a Frog-mouth upon it. Mimicry of wood and bark is a distinctly protective act.

Two nests observed (13.10.99) were composed of a meagre number of short twigs with a few lanceolate green leaves upon each cluster, while both were upon horizontal forks. Breadth of nest 8 inches by 5; there was but a slight depression: it was placed in a *Banksia*, 8 feet from the ground. The young faced the wind and the nesting parent had to be almost pushed away.

49. HALCYON PYRRHOPYGIUS. Red-backed Kingfisher. (Hall's Key, p. 57.)

A. Sk. ad. ♂. } 27.10.99. Geraldton.
B. Nestlings. }

The appearance of the nestlings, which are but a few days old, is surprising. A mass of highly refractive and pale silvery-blue quills, that are exceedingly long, makes them appear very different to young birds in general. These quills shew no barbs and each feather is still within its sheath, in which the barbules are feebly developed. The quills of the whole ventral surface are silvery white, less so on the throat. The quills of the head are fine, imbricated, and silvery in appearance. The quills of the wings and back are pale silvery blue. The tail-quills are deep blue for the partly exposed basal two-thirds; silvery blue for the terminal third. The upper tail-coverts are also in the quill stage, being white with a rufous tint upon them, as if to indicate the coming rufous coverts proper. Beginning at the interscapulum, passing along the spinal tract, and ending below the rump is a series of nut-brown quills that indicate the future area of chestnut feathers. The tip of the beak is pink like the lower mandible, which has a subterminal black band. Both tips are sharply decurved (in each specimen), as if the bird

once needed them bent to hold its food better. Length of wing of nestling 2·5 inches (no exposed feather), of adult 2·75. Lengths of quills :—back 1·25, primary 1·5, primary-covert 0·35, tail 1. One of these nestlings shews three quills bursting on one flank. The rupture is taking place at 0·3 inch from the distal end, and from that point the sheath must be worked away, unsplit. I found that this nestling, like the adult, had a marked vitality and resisted death for a long time.

While wandering along a dry creek near Geraldton my eye was attracted by a patch of white against the cliff. I found it to mark a nest of this species some ten feet above the watercourse, having its entrance two inches broad by one inch high. Thence for a space of fifteen inches downwards was a strong line of carbonate of lime as broad as the entrance to the nest. While I was surveying the nest the owners kept flying to and fro. The bowl of the chamber, which is not lofty (1·5 inch), is 7 inches across. The stench from the nest indicated that it had been occupied annually for years, and *Diptera* (blow-flies) had deposited in the tunnel larvæ which were five inches long and had riddled the guano. The young, I should say, excrete the waste material in a given direction and that against the light, which means along the tunnel. In passing backwards and forwards through this unsanitary channel the parents get the throat, breast, and end of the tail clotted. The young, at the period above described, flick their tails when they are handled, just as the parents do, shewing early an inherited tendency. The young have powerful voices, sounding like the noise of a grindstone at work, to which a jerk is regularly given during each revolution. Every few revolutions a special effort is made by the bird, causing a sound as if spasmodic pressure had been applied to the handle of the stone.

There were four young in the nest.

50. *HALCYON SANCTUS*. Sacred Kingfisher. (Hall's Key, p. 57.)

One sk. ad. ♀. 27.10.99. Long Island, Pelsart Group, Houtman's Abrolhos.

No particular note upon the skin is necessary. Special interest, however, attaches to the distribution, because hitherto no mention has been made of the bird as inhabiting this set of coral islands. It is fond of exploring, and finds its way to a vast number of spots off the mainland. How it now fares on this treeless island (about 7 miles long) is easily demonstrated, because it had chosen the only possible spot to breed in, viz. an abandoned jetty, amongst the planks of which a pair of birds were going in and out. There is brackish water about three miles away, while thousands of lizards are to be had almost anywhere.

51. *CUCULUS PALLIDUS*. Pallid Cuckoo. (Hall's Key, p. 58.)

I procured a young bird at Katanning, 5.10.99; also an egg in a nest of the Red-wattle Bird. The immature bird still retains fledgling feathers on the forehead and sparsely on the chest. The upper tail-coverts are clear grey. I noticed many young birds on the wing at Geraldton on Oct. 29th, shewing olive round the eye instead of clear yellow. I handled an adult bird in the flesh near Albany on Sept. 27th.

52. *CACOMANTIS FLABELLIFORMIS*. Fan-tailed Cuckoo. (Hall's Key, p. 58.)

A. Sk. imm. ♂. 16.10.99. Geraldton.

B. Sk. nestling. 3.11.99. Denmark.

Specimen A.—Brown above, except the tail-coverts, with faint cross-bars appearing as if beneath the surface; upper tail-coverts—the first part of the bird to shew signs of maturity—bluish, the two central feathers of the tail “notched” on the outer web with rufous; the external quills of the tail “notched” on the proximal ends, with white on the outer web and rufous on the distal ends of the same quills and same webs; the middle quills of the tail shew more rufous than white on the outer webs; the breast is more crenately marked than the back; the under tail-coverts are pale brown.

Specimen B.—Nearly ready to fly; the last of the quills

about to burst along the back in a line from the neck to the rump; abdomen not feathered; under surface of feet rich yellow, upper surface slate-coloured; eyes dark brown. Wing 2.55 inches.

The nestling had gradually enlarged the entrance to the nest with its bulky form. It fiercely attacked my fingers when taking it out.

53. *CHALCOCOCCYX BASALIS*. Narrow-billed Bronze Cuckoo. (Hall's Key, p. 59.)

One female. 14.10.99. Geraldton.

This species was recorded in the 'Victorian Naturalist,' vol. xv. p. 145, as new to Western Australia, on the strength of the discovery of the egg. The finding of the bird there makes the statement more certain.

54. *GLOSSOPSITTACUS PORPHYROCEPHALUS*. Purple-crowned Lorikeet. (Hall's Key, p. 61.)

Adult. 29.9.99. Tor Bay, Albany.

55. *CALYPTORHYNCHUS BAUDINI*. White-tailed Cockatoo. (Hall's Key, p. 61.)

One male. 30.9.99. Tor Bay, Albany.

Although this country is suitable for the Black Cockatoo I saw only occasional individuals, while the Red-tailed species came regularly to lodge for the night in a certain area. For three days I camped within fifty yards of a nest of *C. baudini* and could see the birds pass in and out of their home, which was situated high up in a dead Karri gum. A nest was secured later, in the Stirling Range, with two eggs.

56. *PLATYCERCUS ICTEROTIS*. Yellow-cheeked Parrakeet. (Hall's Key, p. 65.)

A. Sk. ad. ♂. }
B. Sk. imm. ♂. } 1.10.99. Tor Bay, Albany.

C. Sk. imm. 27.9.99. Denmark River.

The young birds vary considerably between green and red, and, as in the case of the eastern Rosella, it is some two or three years before the adult plumage is gained. Specimen B shews more green than red along the ventral surface, while C

shews more red than green. The handsome western Rosella and *Barnardius semitorquatus* are the two resident Parrots of the district.

57. PORPHYROCEPHALUS SPURIUS. Red-capped Parrakeet. (Hall's Key, p. 65.)

Sk. imm. ♀. 28.9.99. Tor Bay, Albany.

In the 'Records of the Australian Museum,' Cat. Bds. p. 68 (1891), Dr. Ramsay writes:—"Fem. Similar to the male, very little smaller, but slightly duller in colours. Young (one skin). Similar to adult, but having all the colours of duller tints, &c."

Gould (Handbook Bds. Austr. vol. i. p. 61) speaks of the young during the first year of their existence as being of a nearly uniform green colour; nevertheless the hues which characterize the adult bird are perceptible at almost any age.

The skin which I obtained is radically different, and suggests youth; yet it is that of a breeding bird, first to judge by its worn tail-feathers, and secondly by the fact that for days it accompanied a highly coloured (male?) bird in a quiet forest. It was probably a young individual which had bred early. The following is the description of it:—

Immature specimen.—Head yellowish green; cheeks lighter; faint flush of red on the brownish lores; back and scapulars like head; rump greenish yellow; throat, fore-neck, and chest smutty brown, without any trace of violet; breast, flanks, and abdomen purple-blue; wing-coverts bluish green; band across under portion of wing pale lemon-coloured. The worn tail shews scarcely any white. The bill has the posterior two-thirds dull blue, the anterior third whitish.

An adult skin obtained by exchange shews the lores to be bright red (not dusky red). It appears to be that of a well-matured bird.

58. BARNARDIUS SEMITORQUATUS. Yellow-collared Parakeet. (Hall's Key, p. 66.)

Sk. ad. ♂ & ♀. 26.9.99. Denmark.

A favourite haunt of many individuals of this species was

near the feeding-boxes of the horses at Messrs. Millers' saw-mill. If disturbed they would only fly into the lower branches of adjacent trees and soon alight again.

59. PHAPS ELEGANS. Brush Bronze-wing Pigeon. (Hall's Key, p. 71.)

Sk. young. 18.10.99. Pigeon Island, Wallabi Group, Houtman's Abrolhos.

Pigeon Island is a small treeless area, some ten acres in extent, with shrubs from three to four feet high. It is adjacent to other members of the group that are well able to stock it with the pair of birds which probably gave it a name. This species lies so close that it is difficult to say how many individuals are present. On my visit I saw only one until I traced it to a bush, under which I found a young bird, which allowed me to place my hand upon it. The parent after some moments' deliberation flew away. Both Mr. Campbell and Mr. Helms refer to *P. chalcoptera* as being found on the island, but I did not see it. This species has not been previously noticed as found upon the group.

The query of Mr. Helms, as well as that of Mr. Beddoes*, regarding the nesting of the species in the island, if *P. elegans* is intended, can now be considered settled, because the latter gentleman has noticed the Pigeon on the group at all times of the year and I have brought away with me a skin of a young bird that had very recently left the nest.

60. ÆGIALITIS MELANOPS. Black-fronted Dotterel. (Hall's Key, p. 83.)

A young bird. 27.10.99. Geraldton.

The scapulars and lesser wing-coverts have chestnut and not maroon tips; the forehead is much lighter than the crown, which is brown; there is no band on the fore-neck.

61. HYDROPROGNE CASPIA. Caspian Tern. (Hall's Key, p. 88.)

A. Young, about to break shell.

B. Fledgling. Houtman's Abrolhos.

* 'Producers' Gazette & Settlers' Record of Western Australia,' vol. v. pt. 6, p. 431.

The bill of specimen A, while in the shell at the stage noted, was vermilion-red, but of a paler shade than in the adult.

It seems to be generally understood that this species is solitary while nesting; but this is not always so, because, immediately above highwater-mark on a sandy point, I found some thirteen pairs incubating. Most of the nests had two eggs for the complement, others had only one. The parents rose in a flock when approached and soared overhead, uttering their guttural note repeatedly at long intervals.

But though the birds on the West Wallabi Islands of the Houtman's Abrolhos were nesting together (20.10.99), others were leading a solitary life upon the smaller islets. On Square Island, of the Pelsart Group of the Abrolhos, I observed two eggs (17.10.99) upon the coral-sand, without any pretence of a nest beyond an indentation in the ground.

The members of the Wallabi Island colony (western end) had gathered together a few twigs in a small number of cases; and as these primitive nests were close to salt-bushes (*Salsolaceæ*), I take it that the twigs were from those bushes. So much were the bulk of these eggs like those of the Gull (*Gabianus pacificus*) that I should have been quite unable to identify them had the owners themselves not assisted me, and had it not been for the chicks within the eggs having vermilion-red beaks.

To identify the two eggs on the Pelsart Group was not so easy, because a pair of Terns and a pair of Gulls were present together. The Gulls made no noise, while the Terns did, occasionally passing high overhead, but shewing no signs of ownership of the nests. On taking up the eggs and leaving the beach in the boat's dingey, I was satisfied when I saw one "Caspian" descend upon the place where these valuable eggs should have been. My fear that they would not be identified was thus satisfactorily dismissed. The note of the bird in the night reminded me of the smaller Penguins in southern waters.

Nestling.—Bill coral-red, with a subterminal black band; legs and feet brownish orange. Otherwise as described in the British Museum Catalogue.

62. STERNA DOUGALLI. Roseate Tern. (Hall's Key, p. 88.)

Sk.ad. ♂. 26.10.99. Pelsart Group, Houtman's Abrolhos.

This species was always seen in small companies, and although I tried diligently to find it incubating, it appeared to be waiting for November. Mr. Beddoes speaks of April, June, November, and December as the months for nesting.

63. STERNA BERGII. Crested Tern. (Hall's Key, p. 88.)

A nestling and an adult were secured on Square Island, of the Pelsart Group of the Houtman's Abrolhos. The nestling, though quite young, attempted to swim a considerable distance and had to be shot.

Nestling.—The description agrees with that of Mr. Saunders (Brit. Mus. Cat.), excepting that the upper part of the feet and tarsi are slate-coloured, the under portion of the feet ochreous.

This islet, of some three acres in extent, is flat and sandy, a small part being covered with salt-bush. On it a score of pairs of the Terns had just hatched out their young, and the little birds, from a week to a fortnight old, were hiding or attempting to hide under bushes or running away terror-stricken. Amongst them an Osprey had its nest and young.

64. STERNA FULIGINOSA. Sooty Tern. (Hall's Key, p. 89.)

Sk.ad. ♀. Rat Island, Easter Group, Houtman's Abrolhos. 17.10.99.

Our cutter-yacht, the 'Wanda,' sailed into an anchorage off Rat Island on the afternoon of a fine day. We immediately walked a few hundred yards along the beach to a "rookery" that contained some 2000 Sooty Terns, each of which had deposited or was depositing its single egg under a salt-bush. The *Salsolaceæ*, from two to three feet high and close together, occupy most of the island, which is about three miles long. Through them we "quietly" crashed, and so disturbed the birds which we passed that they scrambled out and did not feel at ease until they had with difficulty risen upon the wing. At least a thousand of them must have been

whirling immediately above us, with many others still higher in the air. Noticing the latter, it is evident in a moment that they soar easily; for in such a position they will sustain their flight for many minutes together with no apparent flapping of the wings. The wheeling is either upwards or downwards, but mostly in the latter direction. Croaking emanates principally from the birds in the "rookery," screeching from those above, and the cry of "wide-a-wake" from a few in the distance. All three sounds may be heard aloft.

At the further end of the island was another "rookery" of like proportions. The opening day of the laying-season meant that the birds' evening fishing-excursion was abandoned. As the sun was setting, at 6.45 P.M., they were as active and noisy as during the other hours of the day. At 9.30 the din was just as strong, and before daylight the babel was still much the same. The fishermen told me that on this first night no birds sleep. The whole island is flat and untimbered, and the two compact "rookeries" severally occupy a few acres as far away from each other as the length of the island permits. Apart from the breeding-months the "Wide-a-wake" is not to be seen on these islands during daylight, but Mr. Beddoes says that it may be heard overhead in the night. That gentleman further told me that when nesting is concluded all the birds leave together or at about the same time, meaning that within three days the whole three thousand comprised in each "rookery" move away to sea. The young are daily trained to go further from land and to remain longer absent, the instruction and encouragement occupying three or four weeks. While the "Sooties" are breeding upon the ground, the "Noddies" are nesting upon the bushes some two or three feet above it; and when some of the eggs are exchanged the birds make no objection, but "sit on." The "Noddies" will hatch out the "Sooty's" eggs and feed the young until they are ready to run about, but no longer. The old "Noddy" is a quiet unassuming bird, and certainly does not like the noise of the young "Sooty," which is "a chip of the old block." So pugnacious is the latter species

that sheep are kept at bay by it. Not so with the "Noddy." I found the "Sooty" a very plucky bird, while the "Noddy" was not in any way pugilistic (facts reversed in Mr. Helms's paper); and this shews how nicely the nesting-habits are accommodated to each, when the sensitive bird places its nest on a bush and the "fighter" lays its egg on the ground. When the young birds are ready to essay a flight they waddle through the bushes to the beach: cripples must needs remain. In the "rookeries" I saw only one abnormal bird: it had the hinder crown and neck mottled, and the mantle looking as if dusted with flour. It could not have been hatched that season, and would be abnormal in any case.

I observed a thousand eggs in the "rookery," from which the birds moved or over which they stood according to circumstances. The crash of the waves on the barrier coral-reef could not be heard above the sounds of feathered life. If three or four people continue to trample through their nesting-ground the sitting birds rush about in a mad paroxysm of fear, scrambling under, over, or through the maze of twigs until they either sink exhausted, frightened into momentary quiet, or gain the air, which to them is home. The egg-laying day is to them surely the most anxious of the year; and the croaking sound of two thousand voices, or say six hundred at a time, ten times stronger than that of two hundred ordinary frogs, from the throats of myriads of birds in close wheeling flight, is truly wonderful. Never have I experienced such a sensation of the marvellous as when I heard that extraordinary din of bird-voices.

The nest is simply a depression in the sand, with a few twigs or empty mollusk-shells scratched up round it, and not always that. All the eggs which I saw were upon the ground under the bushes. A few "Noddies," not more than a score, had nests upon the bushes over the others. I had, of course, a splendid opportunity of examining a magnificent series of eggs. Certain fishermen and others had been out collecting those of the first laying (Oct. 20th), for which they eagerly look out. Their visit was to a distant

“rookery” (in which I had previously wandered), and they had taken from a portion of it about eight hundred eggs, leaving some two hundred, and giving the birds the opportunity to lay again undisturbed. The measurements of the eggs do not vary much, and one pattern of marking governs the bulk; in the minority there are differences. I observed:—

(a) Whitish ground, purplish spots appearing as if beneath the surface and purplish-red spots just above it; on the surface conspicuous spots and blotches of a chestnut-umber.

(b) Ground-colour of green, which is rare, the spots being dispersed as in (a).

(c) Dull rufous ground-colour, with varying spots: this is not so rare as (b).

(d) Reddish-white ground-colour, which is not uncommon, the spots varying in size and number.

The following types, attracting the eye at a glance, provided a series of specimens shewing the stages of pigment-influence in passing along the oviduct:—

(1) Quite white, exceptional. Several years ago I received specimens of this kind from Malden Island.

(2) White, with an innermost faint purple layer of spots and blotches. Specimens varying greatly in size.

(3) Similar to (2), but with a second and stronger layer of spots upon the surface.

(4) White ground-colour, with purple and chestnut spots, which are quite uniform; few blotches.

(5) The type described as (a).

(6) The type described as (b).

(7, 8, 9) The type described as (c); the extent of ground-colour, and therefore of the spots, variable, some lightly, some heavily marked.

(10) Similar to (c), with few but heavy blotches.

The second “rookery,” at the other end of Rat Island, seemed to contain much the same types of eggs, and remained untouched. This is the only one of these islands which the “Sooty” uses for breeding. Each “rookery” contains some two thousand birds.

65. ANOUS STOLIDUS. Noddy. (Hall's Key, p. 89.)

I visited one large "rookery" on Pelsart Island proper, where some two thousand Noddies were assembled (21.10.99). They had not begun to lay their eggs, although it was past the usual date. Mr. Beddoes tells me that this species is the earliest Tern to lay on the Houtman's Abrolhos, and that August 9th is the earliest record which he has of their doing so. The "hovering as bees" only occurs at the initial stage, but it starts again when the young are being taught to fly. The teaching lasts from fourteen to twenty-one days. The young struggle in from the sea at all hours of the day, but the parents arrive *en masse* during the evening. My experience with them was very quiet, because they were assembled in a single colony upon the salt-bushes and upon the bare ground near them. Encouraging some of them to move on simply meant that they rose before us like a cloud such as few people have seen—a mass of quickly-flying bodies in revolution and unmethodical action. Fishermen watch for this sign, and onslaughts upon the eggs soon after follow. It has been observed that by marking off a section of a rookery and taking the eggs, a second and subsequent laying ensues, contrary to what happens if the birds are undisturbed. This season the Noddy had not begun to lay by October 21st, and it was remarked that the sensitive bird had been made more so by the depredations of wild cats, once introduced to subdue the rats. Although the eggs of the two species are externally too much alike to be distinguished from one another, there is a difference in the yolks: that of the Sooty has a deep red yolk, while that of the Noddy has a yellowish one.

Among the four thousand Sooty Terns breeding on Rat Island, 21.10.99, I found only two nests of the Noddy. One was large, and measured eleven inches across, the bowl being 3.5 inches in diameter. It was made of marine weeds, salt-bush twigs, and light filamentous sponges. Both nests were placed on the tops of *Salsolaceæ*, some three feet from the ground, upon which the eggs of the "Sooty" were very numerous.

The day of the vast flocks referred to by Gilbert in Gould's 'Handbook' is past. When guano-workers cease to frequent the islands, and the introduced cats allow the lizards alone to work havoc there, the former state of affairs may return.

66. MICRANOUS TENUIROSTRIS. Lesser Noddy. (Hall's Key, p. 89.)

A, B. Sk. ad. ♀. 17.10.99. Long Island, Pelsart Group, Houtman's Abrolhos.

C, D. Nestlings. 27.10.99. Long Island, Pelsart Group, Houtman's Abrolhos.

On Long Island were two small mangrove-swamps, one with many old nests and a few birds sitting upon eggs, the other containing those of the birds fully engaged in the task of incubation. There were approximately a hundred nests, each containing a fairly fresh egg, on the 17th of October. On the 27th two of the nests contained young some three days old.

Description of nestling.—The young at once assumes a likeness to the parent: the edges of the upper and lower eyelids are bordered by a line of white down; the under wing is whitish; the forehead, nape, and crown are covered with clear greyish-white down, the cheeks being less distinctly white; the bill and eyes are black; the nail of the bill is pure white; the legs and feet are brownish black.

In the adult skins secured, the third and fourth primaries (from the outside) give equal measurements.

Nest.—The material from which to choose for a nest is limited, consisting only of a few land-weeds (salt-bush or occasional herb) and a marine weed or two. The former would not suit the manner in which the loose material is placed, hanging from so poor a support—a basis that is not broad enough to hold stems that are not interwoven. As the bird does not care to adopt the practice of nesting on the ground, it is scarcely optional to use aught but seaweed, to withstand the wind. *Rhodophyceæ* are chosen from the beach, and, being fascicular, they hold together when placed on an irregular fork. How the season affects the gathering

of red weeds and the laying of eggs it would be interesting to know. Very little skill is necessary to obtain a pleasant effect in nest-building among mangroves. The cluster of weeds which form the nest measures six inches across and four inches in depth, the bowl being a slight depression of half an inch.

That this "rookery" has been used for two or more years is shown by the guano upon the branches and older portions of the nests. While making observations, a bird flew at me, and brought blood from my lower lip with its bill.

67. *GABIANUS PACIFICUS*. Pacific Gull. (Hall's Key p. 90.)

Fledgling (about seven days old). 27.10.99. Houtman's Abrolhos.

The nest of this species is a slight "mound" lined with salt-bush twigs.

68. *PELAGODROMA MARINA*. White-faced Storm-Petrel. (Hall's Key, p. 91.)

A. Sk. ad. ♂. 26.10.99. South Island, Pelsart Group. Houtman's Abrolhos.

B. Nestling. 20.10.99. West Wallabi Island. Houtman's Abrolhos.

Nestling.—Except the chin and throat, the whole under surface is covered with a sooty-grey down averaging more than an inch in length. The down has fallen from the upper surface, excepting the crown and rump. The back is deeper slate-coloured than in the adult, and the wings, which are almost free from down, are of the same colour; the hind-neck is mottled with white; the face is deep slate-coloured; the lores white with dark tips; the chin, throat, and cheeks white; the feet slate-coloured, with a very light yellow mark between the toes; the bill is dark. The bulk appears to be twice that of the adult. Girth of nestling at shoulders 10.5 inches; of adult 4.5 inches.

One nestling, well advanced, I found lying dead above the entrance to a burrow and externally uninjured, 24.10.99.

Eggs were found on South Island, Pelsart Group, 26.10.99, fresh and much incubated. The male was observed to be sitting in the daytime. In the course of an hour I was able to roughly examine from six to nine nests, and accomplished the excavation in the loose sand, bound with fibrous vegetation, by hand alone. Many birds were in the hollows, apparently not specially engaged, but keeping apart from their mates while sitting upon the eggs. This is not usual.

69. *PUFFINUS CHLORORHYNCHUS*. Wedge-tailed Petrel. (Hall's Key, p. 92)

From the West Wallabi Island of the Houtman's I procured, in a burrow, a male specimen, in order to ascertain the author of the moaning calls that came from the holes in the daylight. These were quite new to my ears, and did not resemble those of any Petrel in the other large "rookeries" which I have been fortunate enough to visit. During the night these calls would prove quite distressing to a person not knowing the source. My first acquaintance with them was in the daylight, and I felt impelled to make a kind of response, because I thought that some creature was in distress. At first I could only refer the noise to the cats which are wild in the adjacent group. Lying at anchor that calm night I was considerably impressed by what a superstitious person would certainly have called the feeling that an "island" was in distress and moaning in its troubles: circumstances altogether too dismal for an optimist to be within hearing of. My mind was, however, bent upon hard facts, and for the moment was unemotional.

Although my specimen agrees with the measurements noted by Salvin, the colour of the bill does not correspond with the specific nomenclature, because it is slate-coloured with the tip (nail) black; the feet are fleshy white.

Young "Mutton-birds" are very pugnacious, for if two are placed in the same box overnight, one will be found dead in the morning. This surely comes of being "brought up" alone in a burrow. The statement applies also to other species of Petrels.

APPENDIX.

*Revised List of the Birds found on the Houtman's Abrolhos,
and their Nesting-dates.*

PAGE IN 'KEY.'	SPECIES.	NESTING DATES, &C.
3.	<i>Haliaëtus leucogaster</i> Gmelin.	Fledged young in nest, 20.10. 99. Wallabi Group.
28.	<i>Pandion leucocephalus</i> Gould.	Eggs, Sept. and 26.10.99. Young plentiful in October.
93.	<i>Petræca goodenovii</i> Vig. & Horsf.	Considered a "stray."
205.	<i>Sericornis maculata</i> Gould.	Deserted nest of this season, 20.10.99. West Wallabi Island.
231.	<i>Cinclorhamphus rufescens</i> Vig. & Horsf.	Possibly nesting on Long Island, Pelsart Group.
303.	<i>Zosterops gouldi</i> Bonaparte.	Fresh eggs, 21.10.99, 23.11.94. Wallabi Group.
385.	<i>Hirundo neoxena</i> Gould.	Considered a visitor.
390.	<i>Anthus australis</i> Vig. & Horsf.	
452.	<i>Halcyon sanctus</i> Vig. & Horsf.	Appeared to be nesting on Pelsart, 27.10.99. (One pair.)
550.	<i>Phaps chalcoptera</i> Latham.	Doubtful habitat. (See No. 59.)
551.	<i>Phaps elegans</i> Temm.	Young just out of nest, 21. 10.99. Wallabi Group.
571.	<i>Turnix varia</i> Lath.	Fresh eggs, 20.10.99. Wal- labi Group.
577.	<i>Hypotænidia philippinensis</i> Linn.	Known to breed on Pelsart Islands.
584.	<i>Porzana tabuensis</i> Gmelin.	Possibly nesting on islet off Wallabi Group and Pelsart Islands.
600.	<i>Arenaria interpres</i> Linn.	
601.	<i>Hæmatopus longirostris</i> Vieill.	
602.	<i>H. unicolor</i> Wagler.	Fresh eggs, 24.11.94.
607.	<i>Squatarola helvetica</i> Linn.	
614.	<i>Ægialitis ruficapilla</i> Temm.	Young accompanying parents, 26.10.99.
621.	<i>Numenius cyanopus</i> Vieill.	
622.	<i>N. variegatus</i> Salvadôri.	
624.	<i>Limosa novæ-zealandiæ</i> Gray.	

PAGE IN 'KEY.'	SPECIES.	NESTING DATES, &C.
628.	<i>Heteractitis brevipes</i> Pallas.	
631.	<i>Glottis nebularius</i> Gunner.	
633.	<i>Limonites ruficollis</i> Pallas.	
635.	<i>Ancylochilus subarquatus</i> Gmelin.	
644.	<i>Hydroprogne caspia</i> Pallas.	Fresh eggs, 17.10.99; well-developed embryos in eggs, 20.10.99; eggs, 15.12.90 (A. J. Campbell).
645.	<i>Sterna dougalli</i> Mont.	Fresh eggs, 15.11.94; eggs in Dec. 1890.
647.	<i>S. bergii</i> Licht.	Eggs, 17.10.94; young in down, 26.10.99.
649.	<i>S. anæsthesia</i> Scopoli.	Eggs, 23.11.94; embryos well-developed.
650.	<i>S. fuliginosa</i> Gmelin.	Eggs, 6.10.94, 20.10.99; young, 4.11.94.
651.	<i>S. nereis</i> Gould.	Eggs, 3.12.94.
652.	<i>S. sinensis</i> Gmelin.	
655.	<i>Anous stolidus</i> Linn.	Eggs, 6.10.94, 21.10.99. Colony not yet started to lay.
656.	<i>Micranous tenuirostris</i> Temm.	Fresh eggs, 17.10.99. Breeding-season irregular, Sept. to Dec.
659.	<i>Larus novæ-hollandiæ</i> Steph.	Eggs, 14.10.94; also Sept.
660.	<i>Gabianus pacificus</i> Latham.	Eggs, 7.10.94; also Sept.
666.	<i>Pelagodroma marina</i> Latham.	Fresh eggs and nestlings, 26.10.99; eggs with well-developed embryos, 26.10.99, 10.11.94; nestlings, 15.12.90 (A. J. Campbell).
669.	<i>Puffinus chlororhynchus</i> Less.	Eggs, 26.11.94.
671.	<i>P. assimilis</i> Gould.	Eggs, July. Pelsart Group.
716.	<i>Demigretta sacra</i> Gmelin.	Eggs, November.
727.	<i>Phalacrocorax hypoleucus</i> Brandt.	Eggs, 9.10.94. Off Gun Island.
736.	<i>Phaethon rubricauda</i> Bodd.	Egg, 10.11.94.
737.	<i>P. lepturus</i> Daudin.	
738.	<i>Pelecanus conspicillatus</i> Temm.	Occasional in Sept. Wal-labi Group.
743.	<i>Eudiptula minor</i> Forst.	
744.	<i>Chenopsis atrata</i> Lath.	
754.	<i>Nettion castaneum</i> Eyton.	